# AN HOUR WITH A SEWER RAT

A FEW PLAIN HINTS ON

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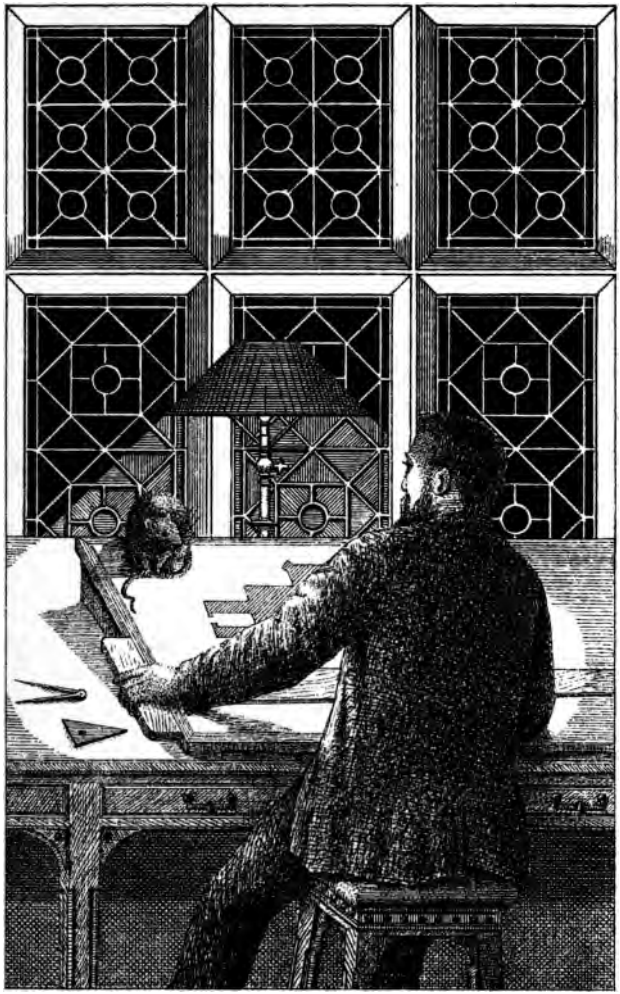

"At the same moment my eyes met two others, small, black, [illegible]cing."

See Page 11.

# AN HOUR WITH A SEWER RAT;

OR

## A FEW PLAIN HINTS ON HOUSE DRAINAGE AND SEWER GAS;

BY

GEORGE GORDON HOSKINS, F.R.I.B.A.,

AUTHOR OF "THE CLERK OF WORKS,"
ETC., ETC.

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"I have such an opinion of the rat's cleverness, that I almost believe he takes in our weekly newspapers and periodicals."—FRANK BUCKLAND.

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LONDON:
SIMPKIN, MARSHALL, & Co.
DARLINGTON:
BAILEY, 7, HORSE MARKET.
1879.

TO

EDMUND BACKHOUSE, Esq., M.P.,

OF

MIDDLETON LODGE,

YORKSHIRE;

THIS LITTLE VOLUME

IS,

WITH HIS PERMISSION,

RESPECTFULLY DEDICATED

BY

THE AUTHOR.

# PREFACE.

READER,

A word or two before you begin. "*Our Town*" is not specially charged with a defective system of house drainage, etc., but its notoriety for having its roads and streets so constantly disturbed, has afforded me an opportunity for my opening remarks.

I also wish to say that the manufacturers whose appliances I have had occasion to refer to, are personally unknown to me. They have no interest in the production of this little work, and are unaware of my intention to publish it.

G. G. H.

*Darlington*, 1879.

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## SECTION II.

# AN HOUR WITH A SEWER RAT;

OR

## *A FEW PLAIN HINTS ON HOUSE DRAINAGE AND SEWER GAS.*

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### Section I.

OUR town is a pleasant town, a clean town, with picturesque surroundings, and on the whole a healthy town. The local authorities of our town have a way of their own of doing things, and if their way is not quite what everyone could wish it to be, it is very much better than the way adopted by the like authorities in some of our neighbouring towns.

One of the chief characteristics of the aforesaid authorities of our town is a *penchant* for the formation of new roads, the repairing of old ones, and the almost

immediate breaking up of both, for some cause or other in connection with the sewerage, gas, or water works.

Whenever we see new material laid down, or hear the snorting of the steam roller, we may almost safely predict that a chasm will very soon be opened, barricaded during the day by rough timbers and earth from the excavation, and dimly illuminated at night by a monster coke fire, presided over by a superannuated navvy.

Not very long ago something was wrong with the main sewer opposite my offices. We had had, I think, the road repaired and neatly rolled about a week before, but now picks and shovels were at work, barricades erected, and as night came on, the inevitable coke fire and watchman (?) made their appearance.

Having a press of work at this time, I had returned to my office after the usual hours, with the object of making a push.

Preparatory to resuming work, I sauntered to the window. There was the coke fire crackling away, and there the superannuated navvy, smoking his pipe, and resting his back against an inverted wheelbarrow, the fire throwing a red glare on the ridges of the heaps of earth thrown up from the excavations. Suddenly I saw a large rat cross one of these ridges and disappear into the surrounding gloom on my side of the road.

I left the window, poked up my fire, and fell to work. A quarter of an hour had perhaps passed, when I had occasion to look up from my work to get an instrument. At the same moment my eyes met two others, small, black, and piercing. On the top edge and on the left-hand corner of my drawing board sat a rat, a fine well-conditioned, intelligent looking fellow, with a self-satisfied air, and a fierce moustache *a la Empereur*:

> "A well-fed rat, rotund and hale,
> Not knowing either Fast or Lent."

If I had been surprised by his appearance on my drawing board, imagine my utter astonishment when he spoke.

"Road up again," said he.

"You're a sewer rat," I returned, with an attempt to disguise my bewilderment at hearing him speak.

"Humph, yes!" he replied, and continued "I dare say you know more about sewer rats than sewers, although you professional gentlemen pretend to be acquainted with all the most *perfect* and *improved systems* of drainage ever invented, yet, as a fact, nearly all are wretchedly defective. Let me see," he proceeded, "what you are up to on that paper. Don't be alarmed," he said quickly, seeing me glance somewhat nervously at my drawing, "I wiped my feet and tail on your mat as I came in."

"I am, as you may perceive," I replied, "laying down a plan of house drainage; you have spoken as if you understood something about drainage and its defects."

Something like a sneer seemed to run from the tip of his nose to the extreme points of his moustache; there was a slight vibration of the latter, as if caused by a chuckle, and he spoke again as follows.

"If I don't know something about house drainage and its defects, I should like to know who does; and there is not a single member of my family—which is a tolerably large one—but to whom the subject is of the greatest interest and importance. I dare say a many of you fellows are under the impression that the defective drainage of a house is with us "a consummation devoutly to be wished." Nothing of the sort! Our city is the main sewer, and if ever we are found without its walls, it is entirely owing to some of you of the *genus*

*homo* having laid down such a bad means of transit of that compound termed sewage, that our commissariat department suffers; we are quite conversant with the whole of the ramifications and network of the drainage system connected with the houses in the neighbourhood, in which we are for a time located, and we know from the nature of the delivery, and in some cases by the non-delivery of sewage, from the main trunk drain of a dwelling into our colony, whether the system of drainage in connection with such dwelling is or is not what you people call effective. If we get something like a tolerably good supply of material delivered with a businesslike rush into our midst, we are being provided for, and are content; but if, on the other hand, we see the mouth of a main trunk drain of a house which we know to be inhabited, either comparatively dry, or dribbling, or suddenly vomiting forth copious quantities of matter of a compact and consolidated consistency, and

then becoming dry again for days together, then we know that we are being cheated of our due, that the transport service which men have established for the supply of our commissariat requires our attention; an exploring party is at once organized, and we are soon on the march."

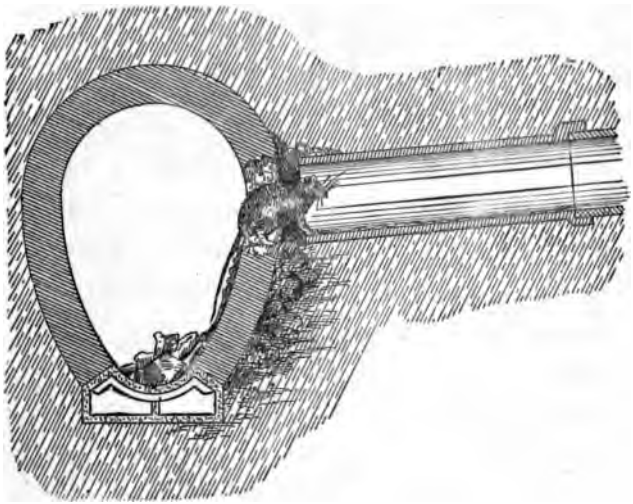
"Not the slightest objection to smoking" continued my companion, with a movement of his head towards my pipe, which I had laid down as I came in, "but you must excuse *me*."

"And what do your exploring parties generally find?" I asked, after filling and lighting my pipe.

"What do we generally find?" he returned, repeating my question; "oh sometimes one thing and sometimes another. I have often been told off on these expeditions, so that I am in a position to tell you by what causes our supplies are interfered with. On one

occasion commencing my investigations by an inspection of the connection of a house drain with the main sewer, I, on taking a leap from the bottom of the latter found myself landed, not on to the smooth surface of the inside of the house drain, as I expected and wished to be, but upon some disturbed brickwork, forming part of the side of the main sewer, from which I climbed into the house drain, the end of which I discovered fell short of reaching the inside of the main sewer. The latter had been carelessly broken into, the drain pipe not connected, and in no way, as you term it, "made good," causing the sewage to distribute itself *outside* the main sewer in every direction, percolating through the soil, and rendering it nothing but a boggy cesspool for many yards round. Now can you make me a bit of a sketch of what I have described, that I may see that you understand me?"

By this time I had become so interested in my companion, that I at once made the required sketch, which is here reproduced.



"Yes," resumed the rat, "that is a very fair representation of how I found matters, and not by any means a solitary instance of my experience, but I can't say that your attempt at my portrait is either creditable to the artist, or flattering to the original;

but this is a digression, caused entirely by your wish to produce something funny. But to resume. Who is responsible for this state of things? Why the contractor, to be sure, or the clerk of the works, if there be one engaged, but in too many cases the blame is saddled on to the men employed to do the work, generally the lowest type of labourers; indeed, I have known "tramps" to be engaged by the builder or his foreman: a class of men who, as a rule, know as much about drainage as Adam knew about his grandfather. I remember one great hulking fellow, a contractor's foreman—*agent* he preferred being called—getting a blowing up on a discovery of this kind. I was sitting in the main sewer, not more than half a yard from the place at the time, and heard him excuse himself by saying he saw it left "a job," but that "they sewer rats must have been a undermining of it,"—a libel on our *race I call that.*"

"Apropos of my last remarks," resumed the rat, "I once heard rather an amusing dispute between a conscientious clerk of the works, and an unscrupulous contractor. The former having detected the latter in an attempt to shirk the proper performance of his contract; the dispute became rather warm and personal, concluding as follows."

"Do you know what happened the last clerk of works as condemned some of my work?" asked the contractor.

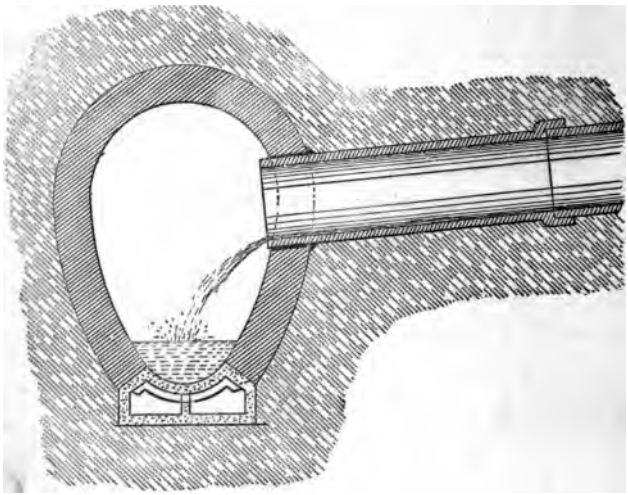
"I neither know nor care," replied the clerk of works.

"Well," continued the contractor, "he *tumbled* into the 'main shore' by *haxident!* so we covered him up, pulled down his office, and cleaned the bricks."

"Didn't you stack them?" was the cool and only rejoinder of the clerk of the works.

"I think Mr. Clerk of the works got the best *of it, eh?*" remarked the rat.

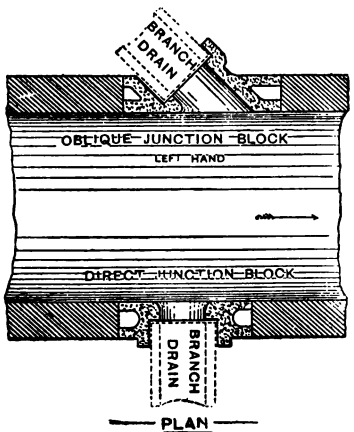
"Well," he continued "that's digression number two; but now let me see another little sketch of how the connection of a house drain with the main sewer *should* be made." Here is the sketch I produced.



"Exactly," continued the rat, "that shows how the work should have been performed. By this ordinary means of breaking into the main sewer you can make a tolerably good connection, when the main

trunk of a house drain runs direct to, or at a right angle with, the main sewer. But a more satisfactory connection is to be obtained by the use of Messrs. Doulton's JUNCTION BLOCKS, particularly in a case where the main trunk drain of a house is required to enter the main sewer at an oblique angle."

"I comprehend," I replied. "I am acquainted with the BLOCKS you allude to. This is what you mean," and I made the following sketch, which he at once recognised.



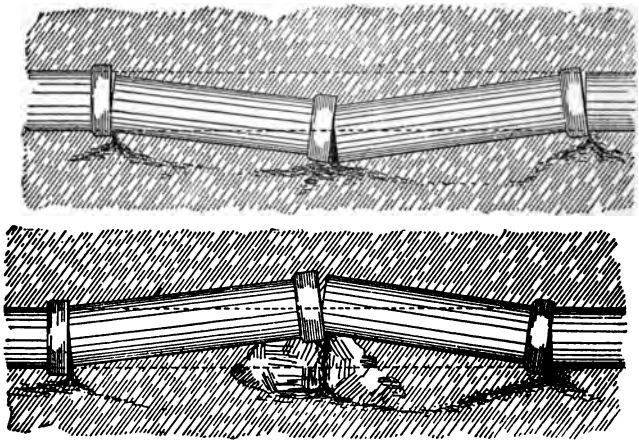
"Returning to the point of leakage, as illustrated by my first sketch, you must have," I suggested, "found other causes than the one referred to; the joints of the pipes, for instance."

"Yes," replied the rat, "I was about to mention them, and the reasons of their being defective. Broken joints occur from many causes, but from two in particular; in one case from the inequality of the bottom of the trench in which the drain pipes are laid, where a slack may occur immediately below the joint, either through carelessness in the preparation of the trench, or by the working away of surface material in making the joints; and in the other case, either by a portion of the bottom of the trench being at a higher level at the point where the joint occurs, or, the existence of a stone, or other hard substance at the same spot. Now as an instance to show how carefully these drains should be laid, we know that to all appearance, before

the earth is filled in upon them, the work would be passed by nineteen out of every twenty uninitiated persons, as having been efficiently performed. As soon, however, as the earth is filled in, the unequal pressure takes place, and then what is the consequence ?"

During these last remarks of the rat, I had been making two sketches, and as he asked the question "what is the consequence ?" his keen black eyes caught sight of my drawing; the first sketch indicating the result of a slack in the trench; the second the consequence of an unlevel trench bottom, or a hard unresisting substance occurring beneath one of the joints.

"Exactly!" he exclaimed, "I could not have shewn it better myself," as he contemplated the following.



"But pardon me," I interrupted, "might not this state of things be obviated by the bottom of the trench being lined with a bed or layer of concrete?"

"Certainly," returned the rat, "it would effectually prevent such an occurrence, but," continued he, "joints are frequently broken from other causes. For instance, drains are, as you doubtless know, often laid, in the case of new buildings, before the *scaffolding poles* are removed, and it not

unfrequently happens that some of the drains are laid so near to where these scaffolding poles are inserted, that the action of the removal of the poles, which is nearly always of a rocking and lever-like process, not only disturbs the earth for several feet round their bases, but also such of the drains as have been laid nearest to them. Then again, drains are, frequently from a desire on the part of a contractor, or others, to save the expense of digging, laid too near the surface, which not only renders the joints liable to be broken, but the drain pipes themselves to be crushed by horses and carts, etc. passing over them. Another difficulty often met with in excavating for drainage works, is a quick-sand, in which case the best plan of obtaining something like a solid bed for the drain pipes, is to lay them on a wide plank, four inches thick; the plank should be well coated with tar, and carefully bedded from end to end."

"Now you will understand," continued the rat, "that the escape of sewage at broken joints, or fractured pipes, should it exist for any length of time, forms a channel, or course of its own, by the side of the drain pipes. These, you people call our "runs," and unjustly charge us with their formation. Supposing then, that such defective joints, or pipes, occur in the main trunk of a house drain, or the soil branch from a W. C., they assist to form a direct column of sewer gas to pass up to the dwelling, and notwithstanding that the drain may be perfect between the house and the first defect, or escape, the earth is scarcely ever so compact as to prevent sewer gas, guided by the line of pipes, reaching the house itself. But still, outside the house, you would say, yes, providing one most important item has not been neglected, namely, the close and careful walling in brick and cement round the soil *pipe from* the W. C., where it passes through

the external wall of the house, and is connected with the earthenware drain pipes."

"While on the subject of joints," I said, "what description of joint is, in your opinion the most effective?"

"Well," returned the rat, "without considering the numerous "*patent*" joints, now manufactured, all of which are more expensive than the ordinary ones, and would prove rather too exhaustive a subject for our present interview, I am inclined to think that the ordinary joints, if made with clay, *provided always*" emphasised the rat, "that it be well tempered, and brought to a proper consistency, are the best, and will the more readily allow of the disjointing of the pipes, should occasion require it."

"I quite agree with you," I said, "and while admitting clay to be the best, I have always specified cement from the very fear of the clay not being properly tempered, in

which case it would be no better than so much mud. Cement makes an excellent joint in cases where no disturbance is likely to take place; should, however, anything like the slightest settlement occur, the cement joint must *break*; there is no elasticity in it as in the case of the clay joint, still, there are cases," I continued, "in which cement joints are unquestionably to be preferred to those of clay; for instance in cases of drains laid under floors. In such dry situations as these, the clay joints shrink from the evaporation of moisture, and have, to my knowledge, caused the most unpleasant results, not only from the nuisance and danger in the escape of sewer gas, but the general inconvenience of the household, and destruction of property in the tearing up of floors, etc. Of course, no man in his senses, and professing to understand his business would construct a drain beneath a floor, if he could possibly avoid it; local circumstances will, however,

sometimes render such a course necessary; and now, before leaving this item I would ask if you, in your perambulations of house drains, have ever discovered any obstruction to the course of the sewage caused by the careless formation of the inside of the clay or cement joint. I allude to the so pressing of the jointing material into the socket, as to form a ring within the drain pipe, and thereby reducing the diameter of the sewage way?"

"Frequently," replied the rat. "I found on one occasion so great an obstruction of this kind, that although it was a nine-inch pipe in which I was travelling, there was barely sufficient room for me to pass through without something like a squeeze. But this sort of thing would never occur if the most ordinary care were taken by the workman to pass his arm up the pipe and wipe off the superflous material inside, before he makes the next joint. I once saw an implement used for this purpose which,

in a narrow trench, serves the purpose better than the man's arm; it was a wooden hoe-like tool, the blade being shaped like that of a cheese-monger's knife, with a handle between three and four feet long."

"Thanks for the idea," I said. "If you will excuse me, I will make sketches of this obstructive joint, and cleaning tool."

"Do you lunch here?" asked the rat.

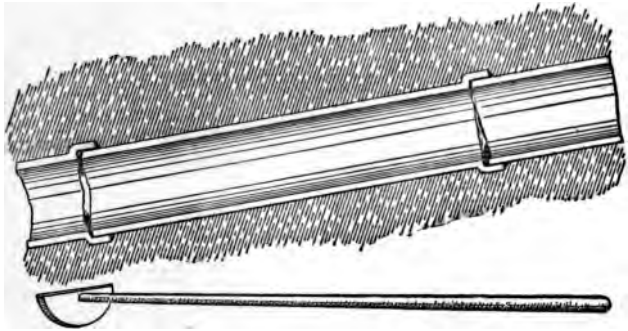
"No, why?" I returned.

"Well, you see," returned Mr Rat, "this discussion is becoming somewhat prolonged, and I thought, while you were sketching I might take a nibble or two."

"Awfully sorry, I'm sure," I said. There is the office-cleaner's candle," I continued, with some amount of hesitation.

"The very thing!" he replied; "I saw it as I came upstairs, and I noted with satisfaction that it was *tallow*. Can't stand sperm or paraffin."

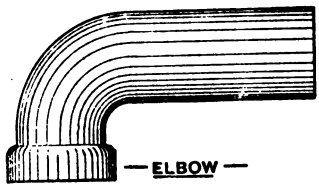
My companion having obtained about an inch of the candle in question, sat himself comfortably on the hearthrug, and refreshed the inner rat, while I made the following sketches.

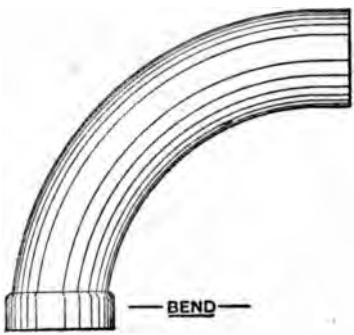


The candle and the sketches being disposed of at about the same time, and my companion having resumed his former seat on my drawing board, I took the opportunity to ask,

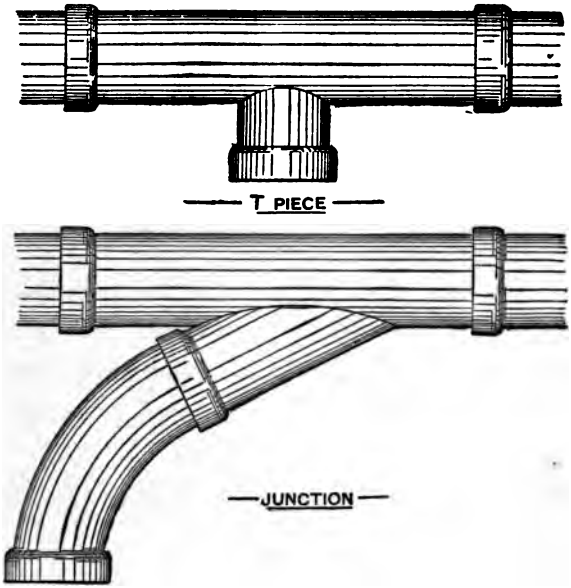
"Does not your experience teach you that obstructions often occur through the injudicious arrangement or planning of the drains, and a bad selection of connections?"

"Certainly," he replied; "for instance, I have discovered, in the case of a drain from a W. C., the introduction of a right-angled elbow instead of a bend of a flat curve,



the use of a T piece in lieu of a junction,




and frequently, in the case of a deep main sewer, the carrying up, from the latter, a vertical shaft of brickwork, or large-sized pipes, allowing the house drain to discharge itself into the upper part or top of such shaft, the sewage thereby getting a direct

fall of, in some cases, eight or ten feet, creating a deposit, to be increased by every subsequent delivery of sewage. This arrangement is generally adopted on the score of economy (?) to save deep digging, often consequent upon carrying the main trunk of a house drain by a gradual inclination to reach the main sewer."

"What," I asked, "are the principal causes of obstruction introduced into the drains, either through the culpability or carelessness of the members of a household. ?"

"A great many obstructions," replied the rat, "are caused either by ignorance or carelessness. Housemaids contribute liberally to the choking of soil pipes by donations of hair combings from the bedrooms, exhausted matches, and occasionally fragments of house cloths. The first two of these, however, do the most mischief. *Hair* will not rot and disperse, but clings

wherever it may find the least hold, gradually accumulating until it assumes the appearance of an imperfectly constructed wasps' nest, choking the D trap of the w. c. apparatus, or any other trap or connection which may afford it the slightest lodgment. Then cooks and scullerymaids contribute their quantum of grease—an item all very well in our way as an article of consumption, but too much in the way in a drain pipe, for the comfort of a household. This grease, particularly in cold weather, accumulates in the pipes, forming an irregular lining, which by degrees reduces the diameter of the sewage way, and ultimately causes a complete stoppage."

"Will you now give me," I asked, "your opinion of the various modes at present adopted for preventing sewer gas from entering buildings; the traps used, and the principles of ventilation you consider the most efficient."

"Excuse me," returned my companion, "these items are scarcely within my province, besides I strongly object to the word *trap*; to my ears it is singularly unpleasant; but I can better bear to hear it uttered by another than I can to mention it myself; the word is associated with some very painful recollections in our family, and I can assure you it has cost me no small effort to speak of it, as occasion has required me to, during our conversation."

"I have," continued the rat, "been at some trouble to point out to you a state of affairs too frequently existing in the case of the lordly mansion as well as its humbler brethren, the villa and the cottage. In rows and rows of attached houses forming miles of streets, where, if the drains of one habitation should happen to be perfect, there are the chances of its tenants being poisoned by a neighbour's drains. I am not specially charging this good old town with this state of things—its existence is

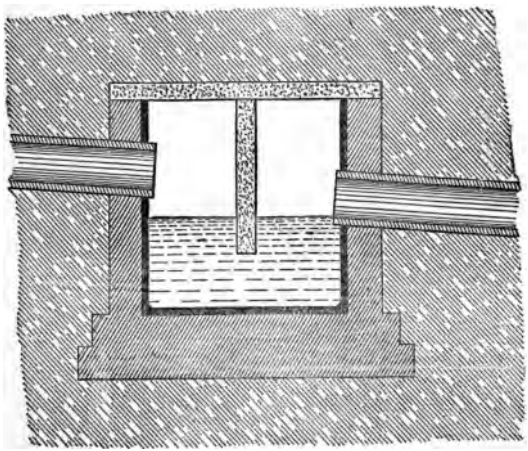
to be found in nearly every part of this 'merrie England' of ours. No," he proceeded after a pause, "let me now play the listener to one whose interest and duty it is to make himself acquainted with this subject, and who, being above ground, has a so much better opportunity of observing the efficiency of the several contrivances you allude to, and if I should have any occasion to interrupt you with a question now and then, I hope you will excuse me."

## Section II.

"I will commence then," I said, "with that most important of all traps, the one which should be fixed in the main trunk drain between a house and the main sewer, or cesspool. I have given much attention to the many sanitary appliances which thought, experience, and enterprise have brought before an awakened and now anxious public; and by way of making my remarks as intelligible to you as possible, I shall, from time to time as occasion may require, submit a few sketches which I have at hand, for your examination whilst I proceed with the subject."

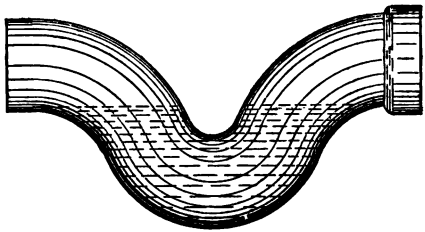
"Curiously enough, the foundation or fundamental principle of all the vast number of the so-called *newly invented* and *perfect* traps, is based upon the old 'dip' trap, formed as every village bricklayer or mason knows how, in brickwork in cement, with

a piece of stone flag, on edge, crossing what may be termed the brickwork box, which is lined with cement, and notwithstanding the amount of ingenuity displayed by the many who have taken the subject in hand, not one, so far as I have been able to ascertain, has been able to get away from the *principle* of this trap. The chief defect in this old-fashioned trap is that it is not in any way self cleansing, owing to its square box-like chamber, as you see by this sketch."



OLD DIP TRAP

"Now the first blow struck at our old friend was consequent upon sanitary pipes superseding the old brick and stone drains, and the introduction of this article,



which represents what is virtually nothing more than a long drain pipe, so depressed or manipulated as to create what may be termed a water valve, or stench trap, by the 'dip,' or lower portion standing full of water; but as water evaporates, and as some drains are not in constant use, and by neglect not often flushed, the trap becomes no trap at all, but a direct contributor to the discomfort and danger of a household.

"A very likely occurrence in the case of bell-traps, often inserted in cellar floors?" suggested the rat.

"Quite so," I returned, "I will give you an instance. A man I heard of salted two sides and hams of a bacon pig, this he did in a cellar, and after scattering some straw over the slop stone, in which a bell trap was inserted, he laid the meat upon it, so that the moisture might run away into the drain, thinking himself wise in his generation, and that his arrangement was a very satisfactory one. Now the trap being hidden, the necessary flushing, which as a rule, was pretty well attended to, was forgotten, and only again thought of when the household was unpleasantly reminded of the fact by the stench of the putrid meat."

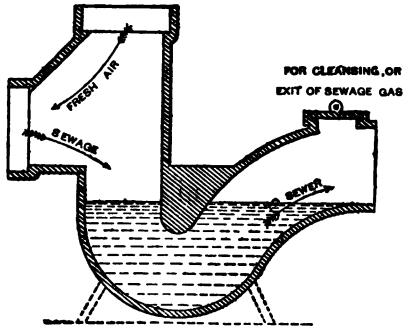
"Didn't save his bacon, eh?" laughed the rat, then after a pause he exclaimed, "what a find the stuff would have been for my tribe!"

"Returning to the trap represented in the last sketch," I continued, "another objection exists, which is this, supposing the diameter or bore of the pipes and trap is not large enough to carry off a discharge without filling the *full way*, *i.e.* containing a compact column of water of the full bore of the pipes, a syphon action will probably occur and empty the trap, and so destroy the trapping; this is almost sure to happen if the fall of the pipe below the trap is somewhat rapid, care should therefore be taken to make something like a calculation of the work required of the drains, and select pipes sufficiently large in their bore, so as not to incur the risk of their ever running full."

"The greatest discharges are, as a rule, those resulting from the "swilling down" of the floors of wash-houses, cellars, court-yards, and areas; the drains from the two latter being frequently too small in proportion to the work they have to do,

particularly in the case of a thunder storm. I will not detain you further by expatiating upon the merits or demerits of the numerous traps now before the public, most of which bear such a strong family likeness to each other, as to be almost practically one and the same, so far as they are designed with the object of effecting the same end, so much so indeed that I am surprised how their authors, who have in many instances patented them, have been able to so frame their specifications as to steer clear of infringment."

"But I come at once to what, after a most careful consideration of the subject, I believe to be the most simple and efficient trap in its dealing with sewer gas, not likely to get out of order, and has the merits of being self-cleansing, inexpensive, and easily attached to existing drains. It is known as BUCHAN'S PATENT VENTILATING SEWAGE GAS TRAP, of which the drawing on the next page is a vertical section.




"Buchan, Buchan, Buchan," mused the rat. "Has there not," he continued, "been some controversy respecting the article lately? I have some recollection of seeing about half a page of a professional journal, which had been washed down into the main sewer; I came across it at one of the outlets; and it being day-light at that point, I glanced over what appeared to me like a fragment of a paper war between a Mr. Buchan and a Mr. Greenwood, as to the origin and merits of a trap. Doctors differing, that sort of thing you know; it was little I read—one letter, I think—but, *from what I* did read, I was sorry to find

so many personalities indulged in. Perhaps you are acquainted with the full particulars of the controversy? If so, I should be glad if you will give me something like a digest of it. I have read just sufficient to wish to know more."

"The facts of the case," I replied, "are briefly as follows. The '*British Architect*' of September 20th, 1878, contained, under the head of 'A good sewage trap,' a very favourable notice of Mr. Buchan's '*Patent ventilating sewage gas trap.*' This drew from Mr. Greenwood a letter in No. 15 of the same journal, Oct. 11th, 1878, in which he indorses all that is said in reference to the importance of the trap, stating that it is seven years ago since he introduced this system of trap and ventilator into work he was connected with, and has since watched with pleasure its favourable progress. He is amused to think anyone should patent it, since it is simply an adaptation of a *principle* which has been in use for the last

twenty years at least. The greatest novelty of it is, in his opinion, the proper placing of it. He objects to Mr. Buchan's sketch of the trap on account of the 'long arms' being quite unsupported, and liable to fracture. He also objects to the want of a proper seat so as to prevent it being placed in a canting position, and thus destroy the trapping. His letter is accompanied by two sketches, one of which (fig. 1) he calls 'a very simple arrangement of interceptor and gully ventilator with a loose bottom D for cleaning and examining the trap.' The other sketch (fig. 2) is a section of the trap which is the subject of the controversy, shewing the seat and strengthening flanges at E, and proceeds to point out that in preference to the drop, or cascade action spoken of in Mr. Buchan's trap, he employs a downward curve, which causes the water to impinge upon the bottom of the trap, rendering it, as nearly as possible self cleansing."

"Allow me to see those sketches," said the rat.

"Certainly," I replied, shewing him the following.

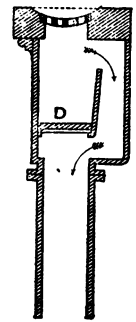



FIG. 1

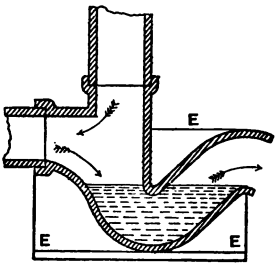



FIG. 2

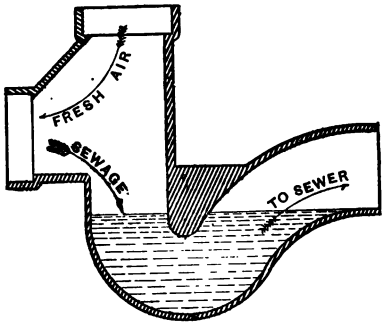
"I see," he continued, "Mr. Greenwood's sketch shews a somewhat more contracted from end to end arrangement. It appears to me however to be one of those cases in which 'Pompey am berry much like Cæsar, specially Pompey.' But Mr. Buchan does not let the matter rest?"

"No," I replied, "the next week's issue of the same paper brought a letter from Mr. Buchan, in which he scarcely sees that the trap sketched by Mr. Greenwood can compare in practital utility with his trap. He has tried both plans and has no hesitation in condemning the round curve, because with it the water glides in round the corner and leaves the fæces floating. This he considers is a strong objection, and one which Dr. Fergus has to all traps with the slope shewn in Mr. Greenwood's, and it was to remove this objection that he Mr. Buchan brought out the sharp edge to give the cascade action and break up and wash the fæces."

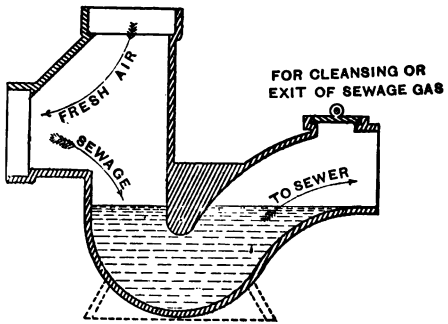
"From this point the corespondence drifts into arguments as to the nature and strength of the material of which the trap is composed, reflections on each other's practical knowledge and personalities of a like description, but, in no instance, so far as I remember, does Mr. Buchan question

the great similarity in the formation of the traps. However, bearing in mind that there is 'nothing new under the sun,' let us give Mr. Buchan the credit of perfecting the idea, and being the first to give the public the benefit of his thought and enterprize, and proceed to consider how he applies the trap; firstly, in itself as a trap proper, and afterwards in conjunction with his system of ventilation."

"The following sketches," I continued, "illustrate vertical sections of Mr. Buchan's traps Nos. 1 and 2, and shew their relative position to the drain from the house, and its continuation—after being intercepted by the trap—to the main sewer. The only difference between the two traps is that No. 2 is furnished with an aperture for cleansing purposes, and the exit of sewer gas. The sizes of the traps in general use are for four inch, six inch, and nine inch pipes; but twelve inch traps can be made if required.




NO.1

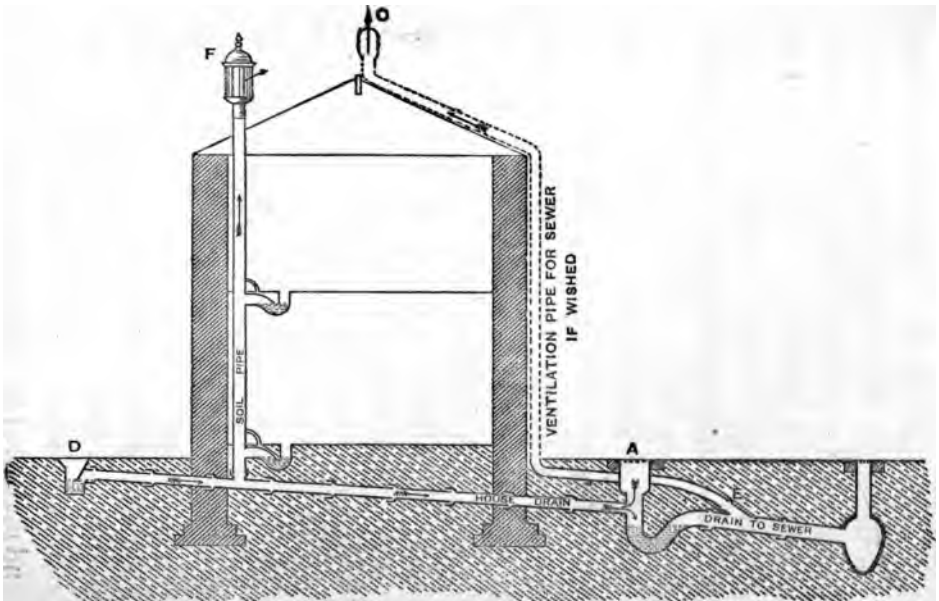



NO.2

"Now as regards the setting of these traps. Although Mr. Buchan has pooh-pooh'd Mr. Greenwood's suggestion as to *the need of* a seat for the trap, Mr. Buchan

has, nevertheless, in some of his latest prospectuses—illustrating the trap—introduced the dotted lines shewn at the bottom of trap No. 2, and in a foot note states 'the dotted lines at the bottom of No. 2 trap shew a seat,' and the traps, when wanted, can be made and supplied in that style if specially ordered;' and as I am about to use these traps in connection with the work I was engaged upon when you did me the honour to look in, I shall certainly avail myself of the seat plan; and so important do I consider the firm fixing, as well as the careful adjustment of such traps, as a protection against anything like a settlement, that I intend having them bedded in concrete."

"After mentioning that the top opening is an aperture for the admission of fresh air, I hope I have made the *details* sufficiently clear for you to understand its application in connection with the system of drainage and ventilation shewn by the following drawing, and described in Mr. Buchan's prospectus."


O
F
VENTILATION PIPE FOR SEWER
IF WISHED
SOIL PIPE
D
A
HOUSE DRAIN
DRAIN TO SEWER

**SECTION.**

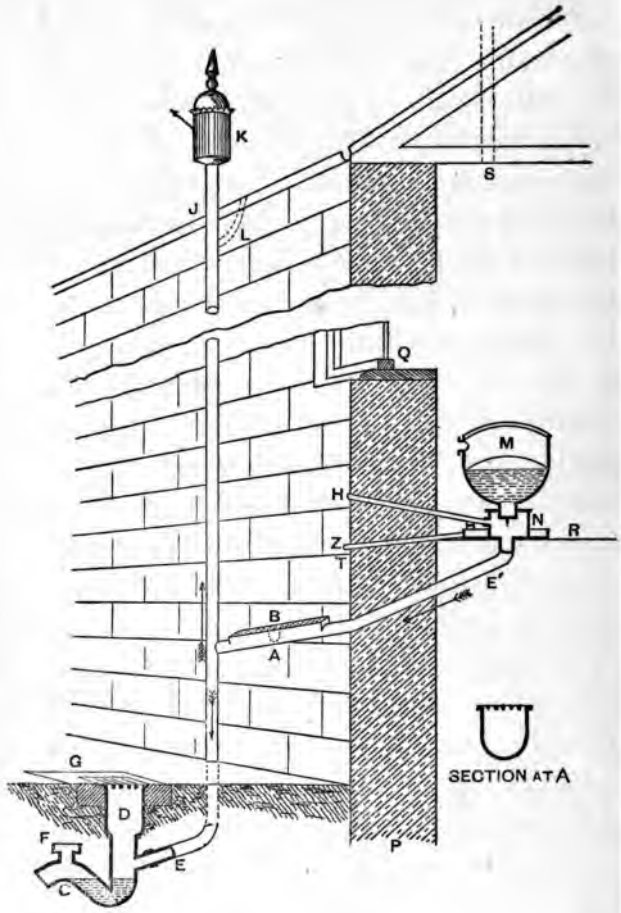
"This illustration represents a section of a building shewing a plan of ventilation of the drains, when the main drain runs through the dwelling, as so often happens as Mr. Buchan observes, in the Glasgow houses, but of course, as you know, the system is not confined to that city. In this case a ventilating syphon trap is put on between the house and the main sewer, shutting off the sewer gas from the house, and at the same time allowing a current of fresh air to enter by the grating A, which, proceeding along the drain and up the soil pipe, dilutes and carries off the sewage gas, and finds exit above the roof at F. The ventilator shewn at this point I presume to be the one which Mr. Buchan terms his '*excelsior*.' The soil pipe may of course be fixed outside the house, with branches passing through the external wall, the principle of ventilation being in no way interfered with."

"It will be noticed that, simply by way of a suggestion, I conclude, Mr. Buchan shews a pipe indicated by dotted lines, and a ventilator C, which he tells us is a 'ventilation pipe for sewer if wished,' and adds by a foot note, 'it is put in to ventilate the sewer or drain beyond the trap; that it does not *pass through* the trap, but *outside* of it, and at any distance, or in any direction necessary.'"

"Is not this suggestion of his," remarked my companion, "somewhat of a reflection on the efficiency of his pet trap? Why a private dwelling should be the means of ventilating a public sewer I cannot conceive."

"Well," I replied, "I can only regard it as an item of extra precaution in the case of anything happening to the trap, say from fracture caused by settlement, in which case, if the efficiency of this trap were interfered with, then only a minimum amount of sewer gas would pass into the house drain."

"Now before leaving the subject of soil pipes and their ventilation," I continued, "I will explain to you a more simple plan recommended by Mr. Buchan, and which has recently been made the subject of a letter of his to some of the professional journals published on January 31st and February 1st last, from which I shall quote. He states that the idea was suggested to him by a perusal of Dr. Robert Bell's 'Sanitary Science' in Blackie's Encyclopædia, the speciality of which is the use of an open-air channel pipe, as marked at A on the sketch, and occurs upon the branch soil pipe. It is made upon the pipe outside of the wall, and breaks the air connection between the upright main soil pipe and the branch soil pipe without interfering with the free flow outwards of the soil. The plan is *not patented*, and all and sundry are free to use it. He then proceeds to describe his scheme as follows. I quote Mr. Buchan *verbatim*."


K
J
L
S
Q
M
H
N
R
Z
T
E'
B
A
G
D
F
E
C
P
SECTION AT A

"I have shewn the water closet without a syphon trap under it, but such may be used if desired. M is a Bramah valve closet, which requires a small trap for the overflow, especially if the under trap be omitted; H is the ventilating pipe from the branch soil pipe E, the fresh air entering at the open side of A, nearest the water closet; T is the safe pipe with a hinged flange upon its outer end; C is a ventilating six-inch drain pipe; D is an opening for both fresh air and cleaning. The fresh air entering at D comes out at the fixed ventilator K above the roof; the air current of the main soil pipe E tends to induce a current from the open end of A next the soil pipe, so that no smell from the soil pipe comes out at A; B is a thin swinging valve of thin tinned copper, which I do not consider necessary; Q is the water closet window; and S a ventilating pipe from the w. c. apartment if wished. It is supposed that the air channel at A may be about two

feet long; with its use the short piece of soil pipe between it and the house could do almost no harm, as the pipe H would prevent any accumulation of sewage gas in it, especially if the water closet were properly flushed when used, and kept as a water closet, and not as a cesspit.'"

"Although only one water closet is shewn as joining the upright soil pipe, several might join it, each with its own branch pipe and open channel A, it being remembered the shorter the branch soil pipe between the water closet and A, the less sewage gas will be generated, consequently all water closets and sanitary fittings should be close to, and as near an outside wall as possible."

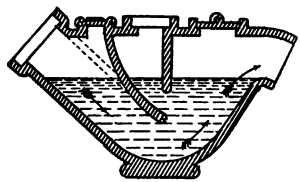
"So far," said the rat, "I have followed you, but I noticed in your quotation of Mr. Buchan's description that no reference is made to several of the letters shewn upon the drawing, J and L for instance."

"The former," I returned, "is evidently intended to indicate the eaves gutter of the building, and the latter a bend, or neck for conveying the rain water from the eaves gutter to the soil pipe E, thus making the latter serve the treble purpose of a rain water down spout as well as a soil pipe and ventilating pipe. The arrangement is simple enough—more simple than sightly—and if I felt inclined to adopt it, I should, for obvious reasons, in the course of planning my building so concentrate my water closet arrangements, as to occupy the most isolated, screened, and windowless portion of my building; as I cannot help viewing with suspicion, in spite of Mr. Buchan's assurance to the contrary, the open channel A, and the outlet of pipe H."

"Hitherto," remarked the rat, "you have confined yourself to the contrivances of Mr. Buchan; surely there should be a good word or two to be said for others."

"Quite so," I replied, "I have been led from one point to another owing to my very decided approval of his trap, more than any other; but there are as many kinds of traps as there are systems of ventilation, and where I think well of one I may condemn the other."

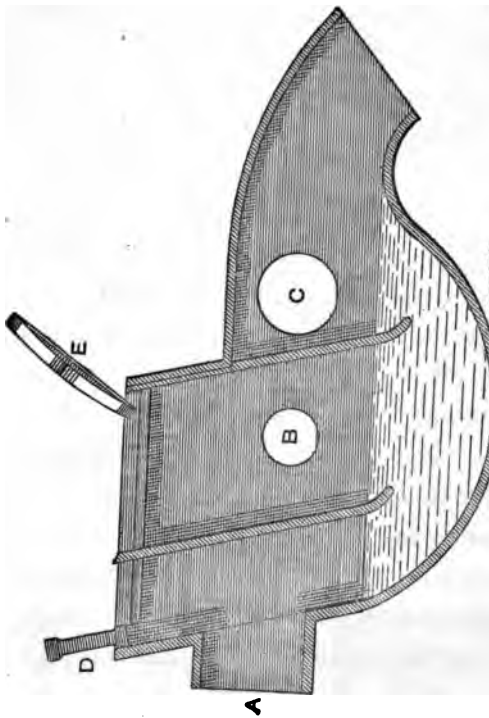
"There is," I continued, "a trap, of which the following is a vertical section,



STIFF'S TRAP

manufactured by *Messrs. James Stiff and Sons*, and which has some of the elements of Mr. Buchan's trap; or it is what may be termed a composition of the Buchan and Greenwood traps, and I have no doubt, would do its work perfectly well. But the

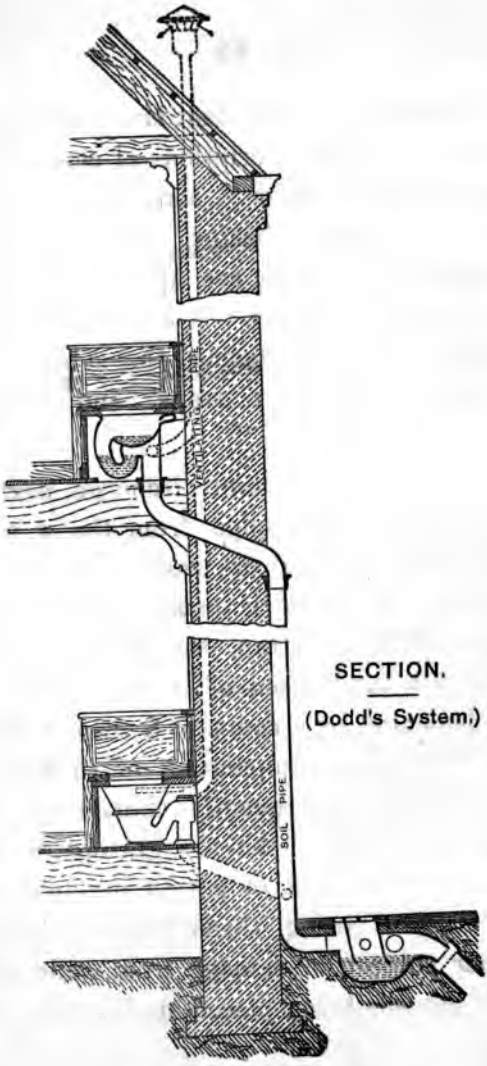
trap which, in my opinion, is the next in order of merit to Mr. Buchan's, is *Dodd's Patent Duplex Stench Trap*, a vertical section of which is here."




SECTION.

A, inlet for soil pipe from closet. B, inlet for waste from bath, lavatory, or sink. C, inlet for rain water, or for sewer ventilation. E, grating to receive surface drainage. D, grid, allowing current of air to pass up soil and ventilating pipes.

"The principal fault of this trap, to my idea, is that it is manufactured in *cast iron* instead of *stoneware*. In connection with this trap the patentee, Mr. John Dodd, of Liverpool, has introduced a system of *ventilated water closets*, which, for simplicity and efficiency is scarcely second to any introduced or suggested by Mr. Buchan or any other person. Its greatest simplicity is owing to the closets being valveless, and having no other mechanical appliances or arrangements. The ventilating orifice is as large as the closet will allow, and being placed above the water in the trap, at once relieves this from pressure of the sewer gas, and provides a ready outlet for the latter. Here is a sketch which illustrates Mr. Dodd's system. It represents a section of a portion of a building containing two of the ventilated closets before referred to, and shews the application of the 'duplex stench trap' to the soil pipe and drains."




**SECTION.**

(Dodd's System.)

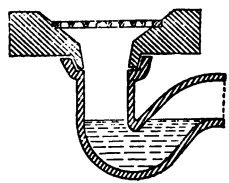
"I should mention that Mr. Dodd manufactures several descriptions of closets, and although they differ to some extent in the shapes of their basins, and section of trapping below, all are applicable to his system of ventilation. A few remarks now upon what may be termed the subordinate branches and their traps, and I shall conclude the subject."

"The most important discharge, next to that from the soil pipe from the w. c. is from the kitchen or scullery sink, the trapping of which is usually effected by means of a bell trap, the grating being flush with the bottom of the sink; this is supplemented by a common S trap, formed simply by the manipulation of the waste pipe, which is frequently choked by the servants removing the top grating of the bell trap, to admit of potato parings and other refuse being thrust down. It is further subject to damage from pails and other utensils being placed under the sink.

The waste pipe is also, as a rule, carried directly to the main drain, without any intercepting trap."

"Now I am not so much prejudiced against the old bell trap *for sinks* as many are. The principle is not so bad as the way in which it is carried out. The bell traps generally used are too small in their diameter, and the trapping is not deep enough. I am afraid most of us are more ready to accept some new idea, than we are to consider what is really good about those we have, and endeavour to improve them. I believe the speculative builder has done much to bring the bell trap into disrepute. A bell trap he must provide to his sink, and the less the cost the better it suits his pocket; the manufacturer knows this, and competition being the order of the day, they produce the miserable appliances we continually come across. I have seen some bell traps in old country houses, which would put to shame the wretched articles

I have also seen fixed in some of the largest mansions at the west end of London. Well, I will stick to the bell trap, or rather its principle; and in lieu of the S trap formed out of the waste pipe, insert one of Carter's patent—Halifax—three-inch traps with large brass cleaning screw; carry the waste pipe through the external wall, and let it discharge itself on to a slop-stone outside, beneath which I would insert a trap similar to the one Mr. Buchan terms his 'anti-bell trap,' section thus—



ANTI-BELL-TRAP

It is a fire-clay syphon trap, with a fire-clay slop stone and iron grating above it."

"While on the subject of fire-clay, I am surprised that it is not more extensively

used in the manufacture of sinks. Sinks *are* made, I am aware, but they are generally so small as to be useless for even a moderately-sized house, and so misshapen as to incline in all directions, instead of the right one. I remember some years ago specifying these sinks for an infectious hospital I was then building, and it was with the greatest difficulty I got even very small sinks fit to use. I was told by more than one manufacturer, that it was almost impossible to prevent them getting twisted and otherwise damaged between the processes of forming and baking them. I should very much like to see this state of things overcome; for in my opinion a well-made fire-clay sink, carefully glazed and burnt, is preferable to the best oolite stone sink procurable."

"As regards the wastes and trappings of baths, lavatory basins, sinks in butlers' pantries and housemaids' closets, I see no reason to make any exception to that

suggested for the scullery sink beyond the size of the waste pipes, which in all cases excepting that from the bath may be reduced from two inches to one-and-a-quarter inch in diameter, according to the size of the sinks, etc."

How much longer I might have pursued the subject I cannot say, but at this moment I happened to look up from a paper before me, upon which I had been scribbling as I spoke, to find that my fire had gone out, and with it my friend the rat. He had left as silently as he came; so, putting on my great coat, I followed his example. As I reached the street I heard the superannuated navvy grumbling to a policeman.

"Some cussed dawg," he said, "had nailed his mornin's grub, but," he added, "I never seed one nigh it."

Ah! Monsieur le Rat! thought I, as I wended my way homewards.

Bailey, Steam Printer, 7, Horse Market, Darlington.